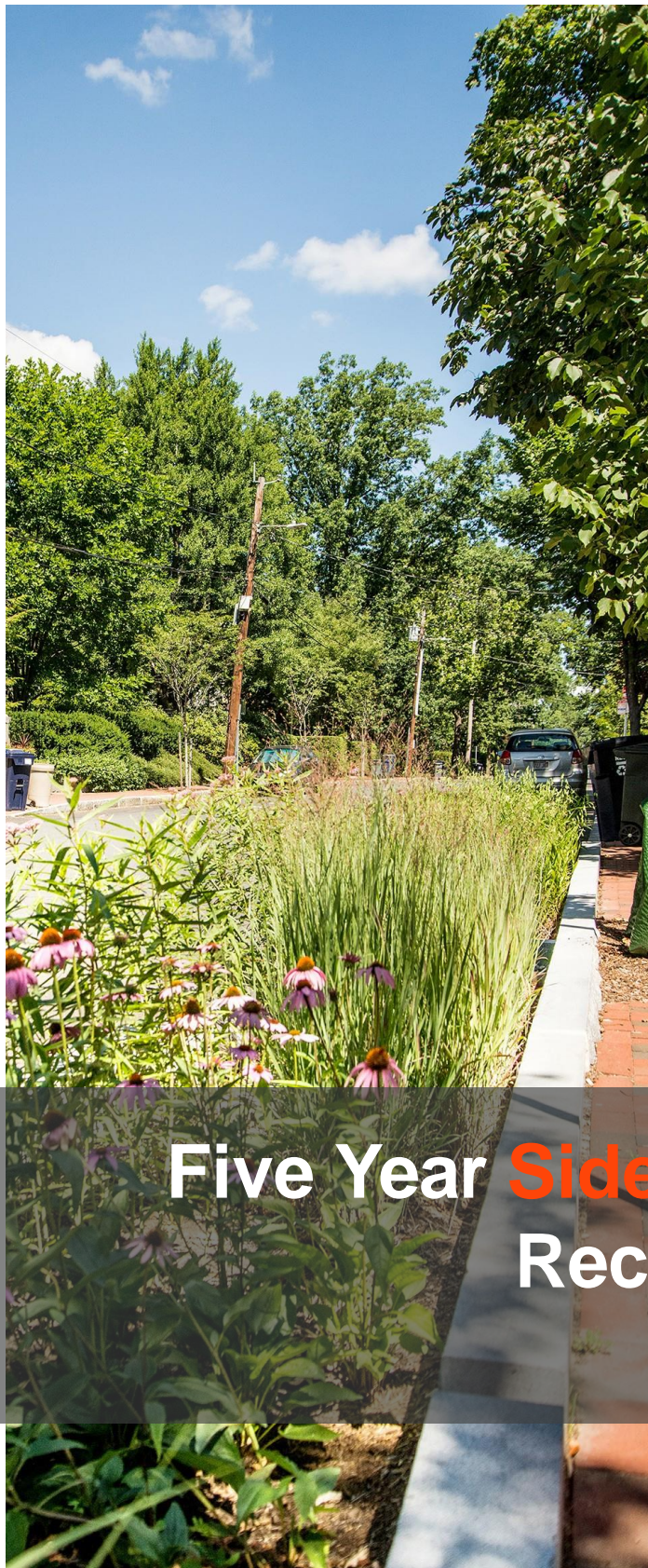


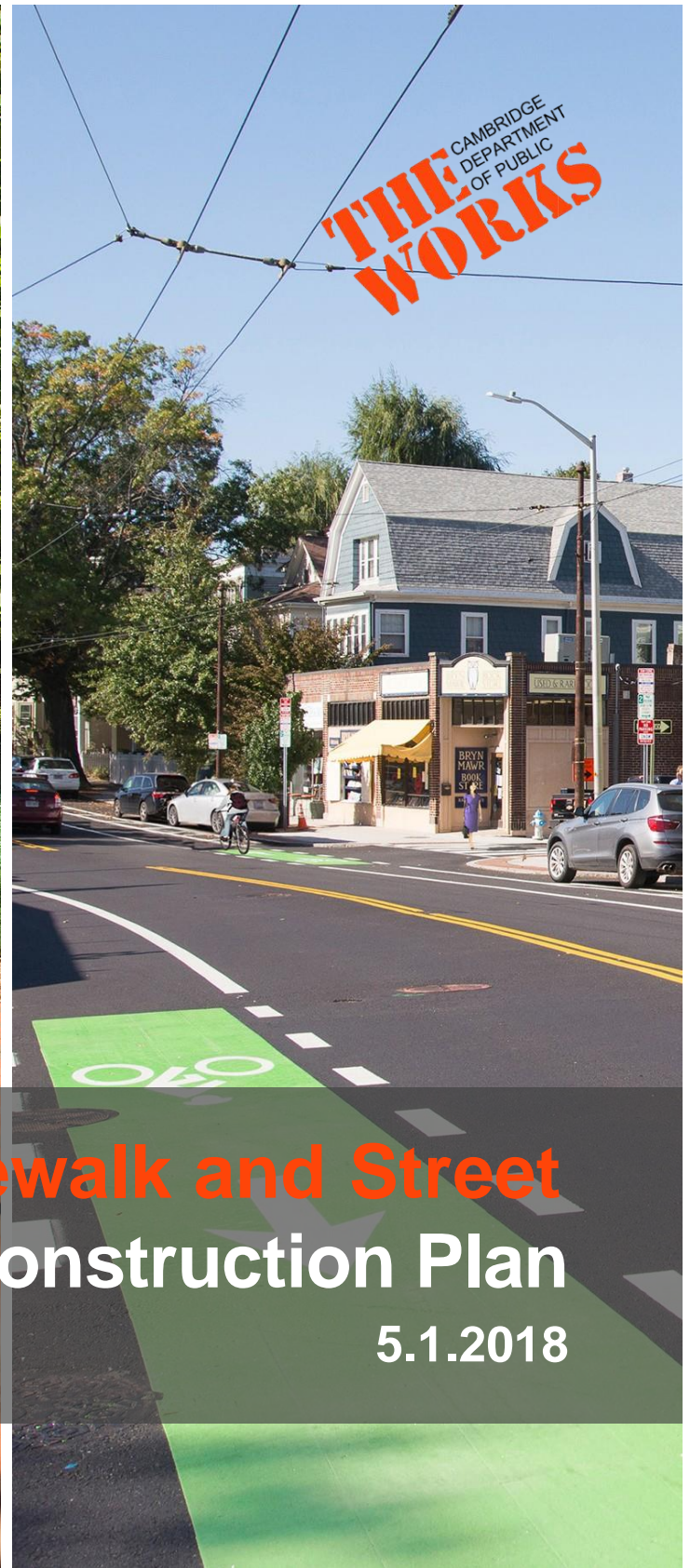


City of Cambridge  
Department of Public Works



# Five Year Sidewalk and Street Reconstruction Plan

5.1.2018



CAMBRIDGE  
DEPARTMENT  
OF PUBLIC  
**THE  
WORKS**



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## INTRODUCTION | COMPLETE STREETS

Complete Streets are **streets for everyone**. They are designed and operated to enable **safe access for all users**. Pedestrians, bicyclists, motorists, and public transportation (transit) users of all ages and abilities are able to safely move along and across a Complete Street. Complete Streets make it easy to cross the street, walk to shops, and bicycle to work. They help buses to run on time and make it safe for people to walk to and from train stations.

More sidewalks and bicycle facilities are included, which provides **increased accessibility for pedestrians and cyclists**.

During design and construction of Complete Streets, our goal is to communicate projects with neighborhoods, facilitate an integrated design process, minimize disruption to community life and provide reasonable access for all users during reconstruction.



# INTRODUCTION | VISION ZERO

On March 21, 2016, the Cambridge City Council unanimously passed resolutions put forth by the City Manager to formally adopt Complete Streets and Vision Zero policies, showing that the City of Cambridge is committed to achieving these goals, assuring safe access for all users.

**Vision Zero calls for the elimination of fatalities and serious injuries resulting from traffic crashes**, and emphasizes that they can and should be prevented. The City of Cambridge is the 17th city in the U.S. to commit to a Vision Zero Policy.





# PRIORITIES | CONSTRAINTS

- Based on budget predictions that are uncertain.
- Based on future street condition assessments that are subject to change.
- Severe winter conditions can lead to higher than expected levels of deterioration on streets.





# PRIORITIES | CONSTRAINTS

DPW will review the 5 Year Plan on an annual basis. The variables and constraints are significant, and thus the annual revisions may need to reflect these uncertainties.

- Based on sewer separation / storm water management project schedules that are uncertain.
- Does not consider utility failure / repair / replacement which is unpredictable.



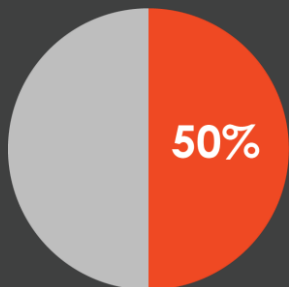


# PRIORITIES | SCHEDULING

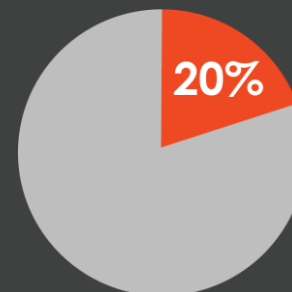


Reconstruct sidewalks and streets in poor condition in **High Priority Areas**:

- Areas within a 150 ft. buffer of parks, major squares, libraries, schools, youth centers, elderly housing, and senior centers.
- Areas within a 40 ft. buffer of bus routes.
- Major thoroughfares to maintain the structural integrity of streets under heavy traffic.
- Streets on the Bicycle Network Vision plan.
- Priorities identified by the Commission for Persons with Disabilities.



Just over 50% of city sidewalks and streets are located outside of high priority areas. These corridors serve residential connections and need to be maintained, to the extent funding allows.



Approximately 20% of street and sidewalk funding will be reserved for these locations.



# PRIORITIES | HIGH PRIORITY AREAS



Streets and projects are evaluated in coordination with the **Cambridge Bicycle Plan** to identify streets with non-existent or inadequate bicycle facilities, particularly where reconstruction could improve connectivity and route continuity for cyclists.

[www.cambridgema.gov/CDD/Transportation/bikesincambridge/bicyclenetworkplan](http://www.cambridgema.gov/CDD/Transportation/bikesincambridge/bicyclenetworkplan)



# PRIORITIES | SIDEWALK CONDITIONS

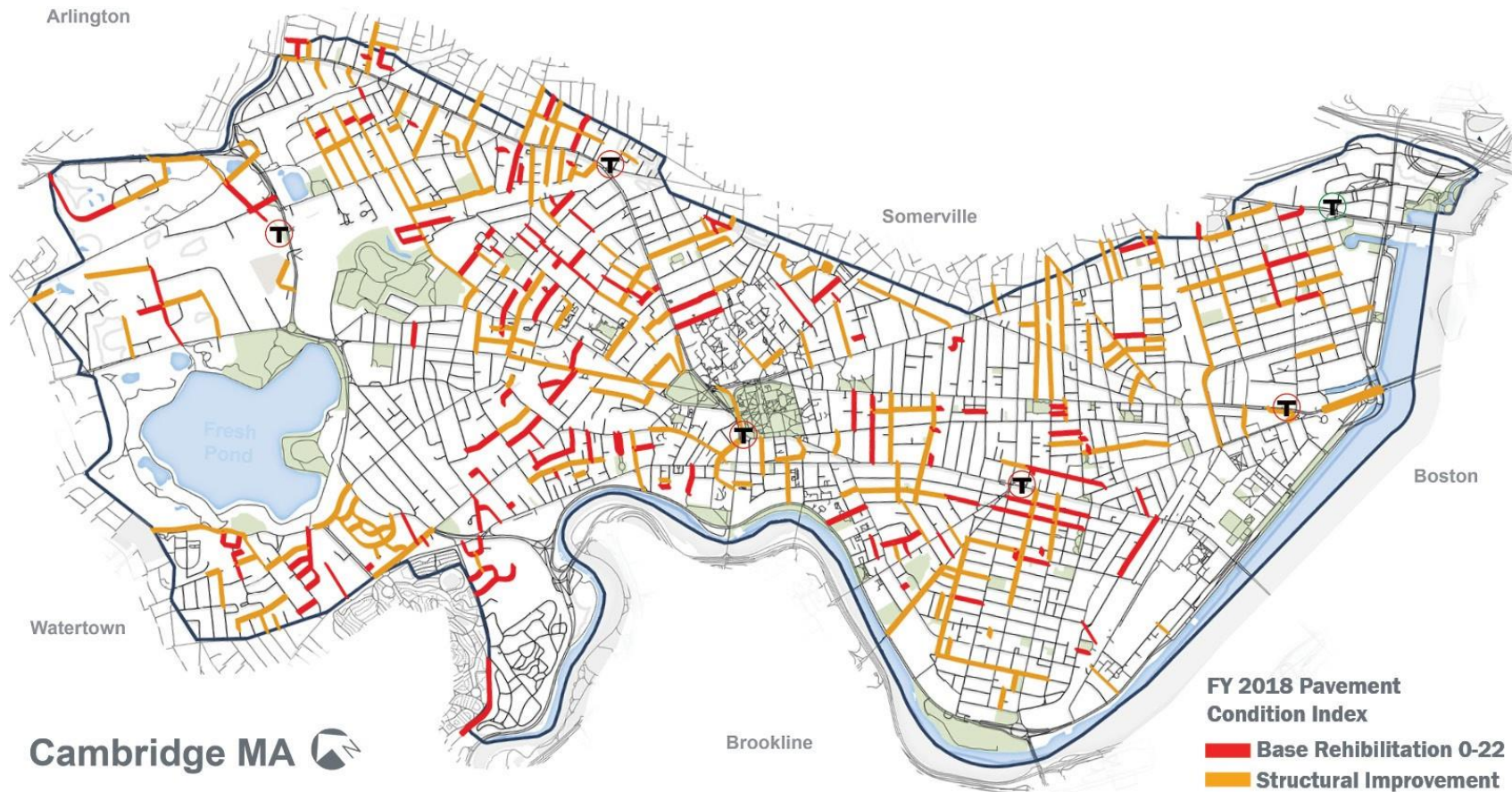


Based on the criteria below, each block of sidewalk received a rating between 0 (excellent) and 35 (poor).

- Driveway conditions
- Trees or other obstructions
- Cross-slope
- Overall structural condition



# PRIORITIES | PAVEMENT CONDITIONS

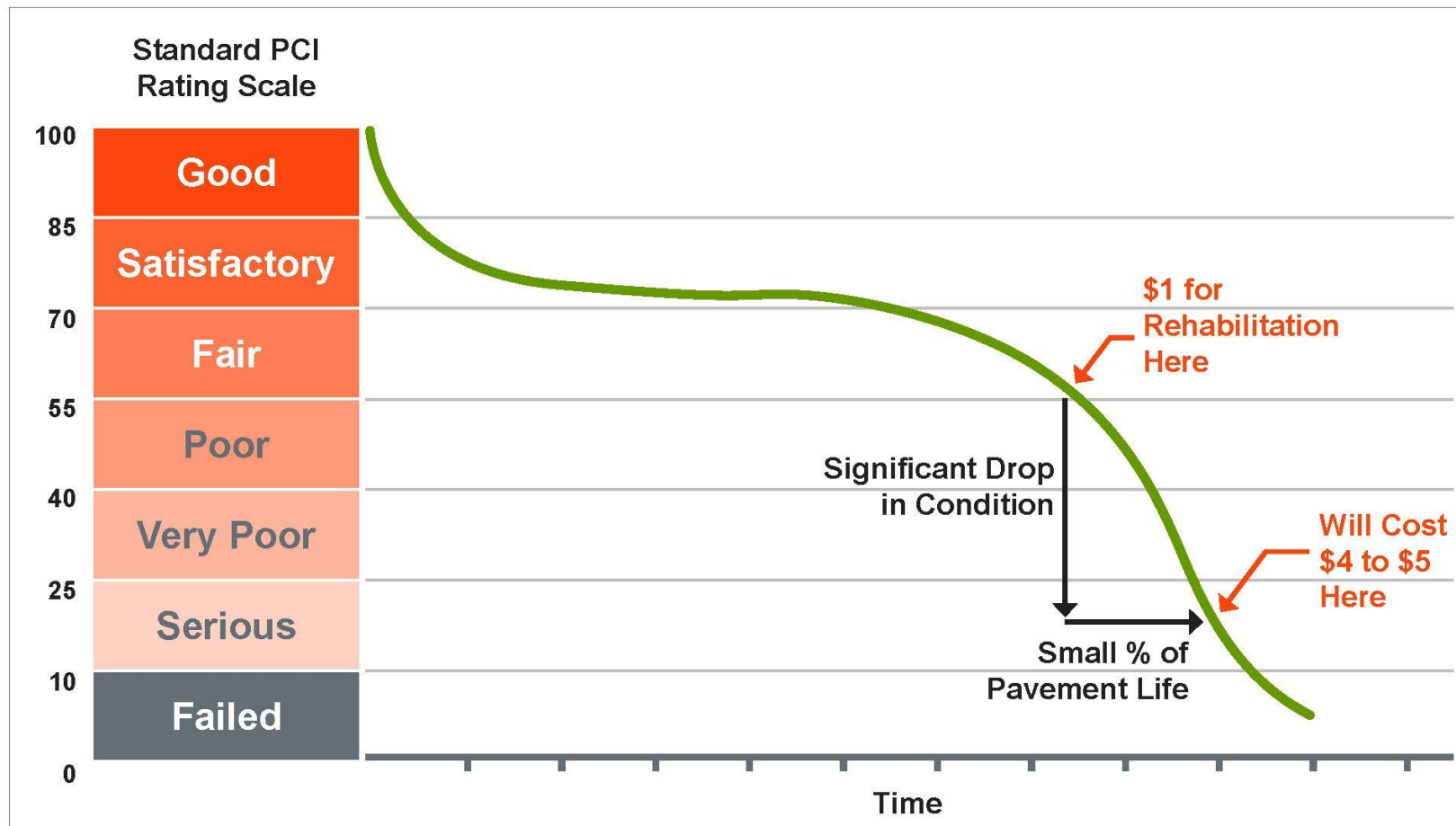


FY 2018 Pavement Condition Index  
Capital Construction Streets

New street condition assessments are completed every three years and the plan is updated accordingly.



# PRIORITIES | PAVEMENT CONDITIONS



**Pavement Condition Index:** City Average 68.8.

- This City average is holding steady, but backlog is growing.
- An increasing number of streets are in the Base Rehabilitation range (0 – 20).



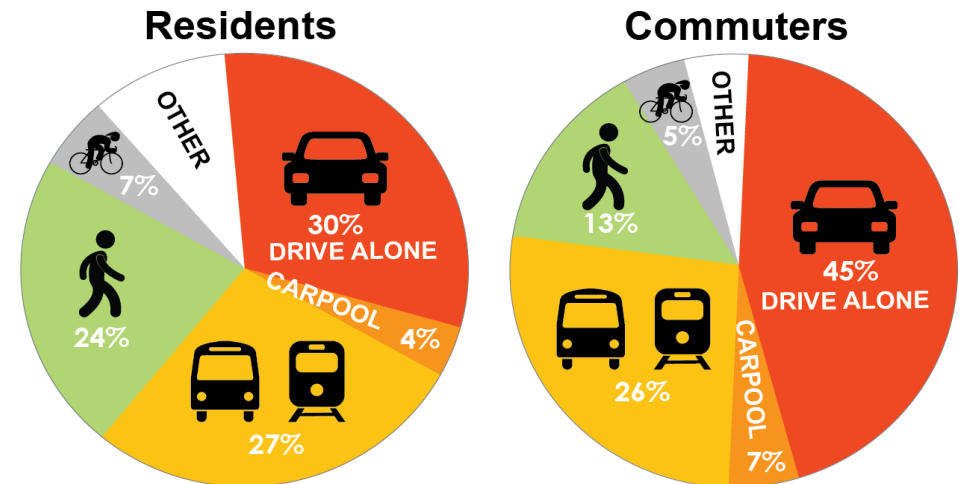
# PRIORITIES | TRANSIT



*The photos above illustrate the same number of people in cars versus in a bus.*



## Cambridge Commuting: Getting Around



## Benefits of good transit access:

- A sustainable and efficient mode of transportation that moves people safely compared to driving in private automobiles.
- In some cases, more people on the road may be on buses than in private cars.
- Allows our dense economic and commercial centers to thrive (e.g. Kendall Square).



# PRIORITIES | FUNDING

**\$6 million** per year for street and sidewalk

- State Funding: \$2.5 million Chapter 90
- City Funding: \$3.5 million

More Demand than **Funding** or **Ability to Construct**

- Identify streets in high priority locations that benefit the most people.
- Identify streets that have overlapping needs / benefits.
- Identify streets that prioritize accessibility, active transportation, and safety.
- Identify streets that maintain infrastructure.

Additional City Funding:

- Inman Square: \$6 million
- River St: \$34 million





## 5 YEAR PLAN | SCOPE OF WORK

Our approach emphasizes **streets designed and operated for everyone**. Pedestrians, bicyclists, motorists, and transit users of all ages and abilities will be able to safely move along and across **Complete Streets**.



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Emphasis on accessibility – pedestrian ramps, sidewalks and universal design.



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Vision Zero calls for the elimination of fatalities and serious injuries resulting from traffic crashes.



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Transit improvements – accessibility of bus stops and transit priority, as feasible.



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Network of bike facilities – support people of all ages and abilities to bike safely throughout the city.



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Additional street trees and green infrastructure.

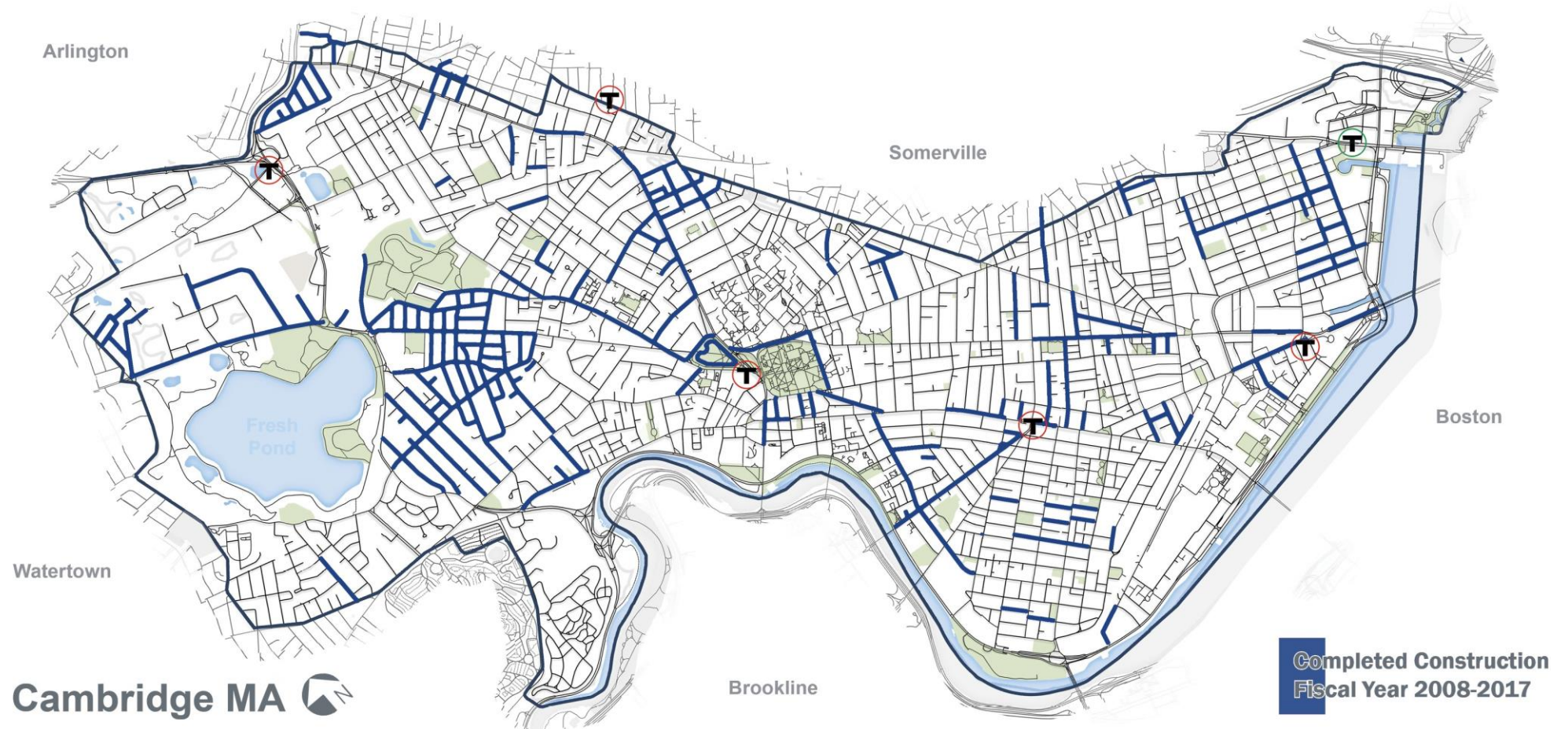


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Maintain and improve city infrastructure, and coordinate with private utilities to facilitate upgrades.



# 5 YEAR PLAN | COMPLETED STREETS





# 5 YEAR PLAN | **PLANNED CONSTRUCTION**

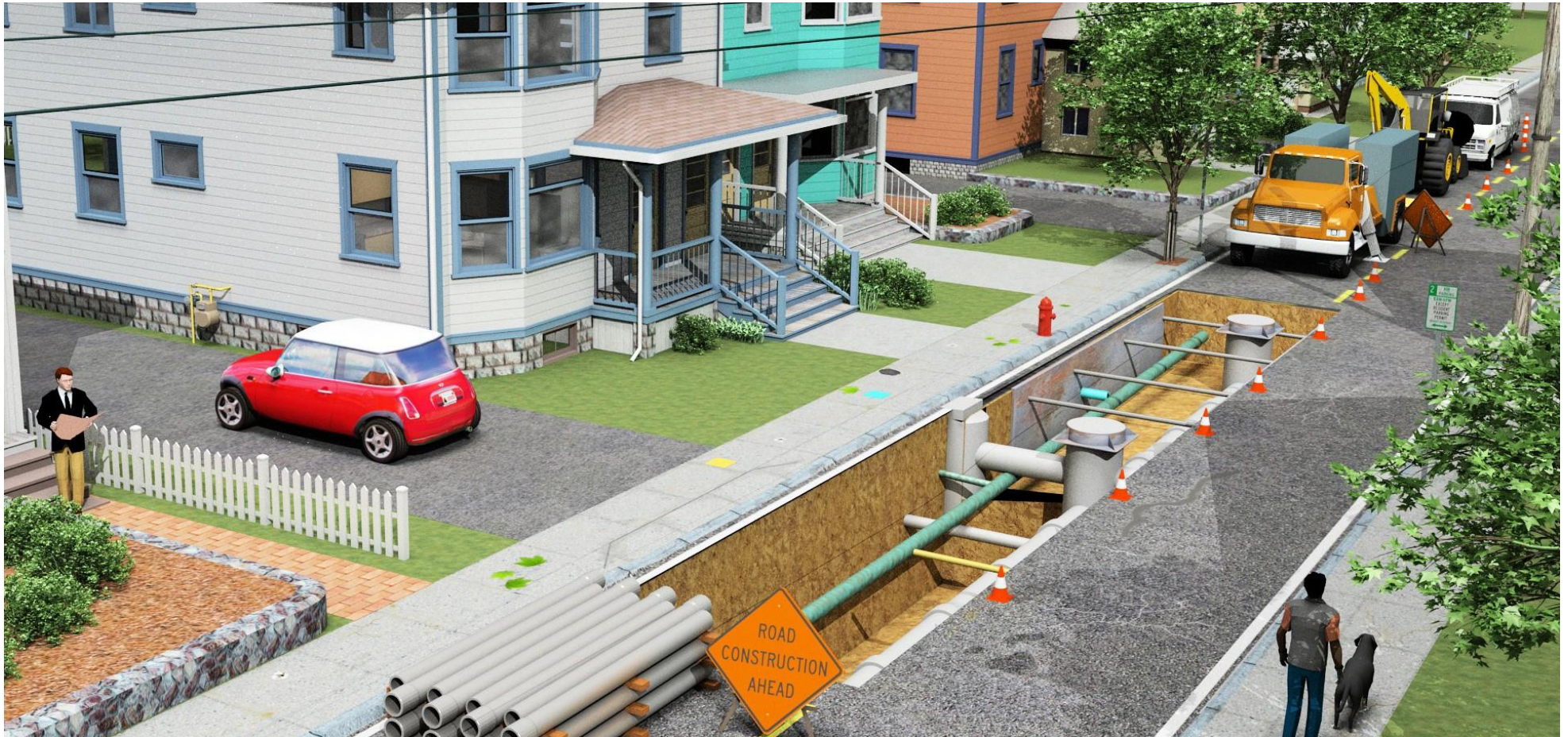


Interactive construction map: [www.cambridgema.gov/theworks/constructionmap](http://www.cambridgema.gov/theworks/constructionmap)



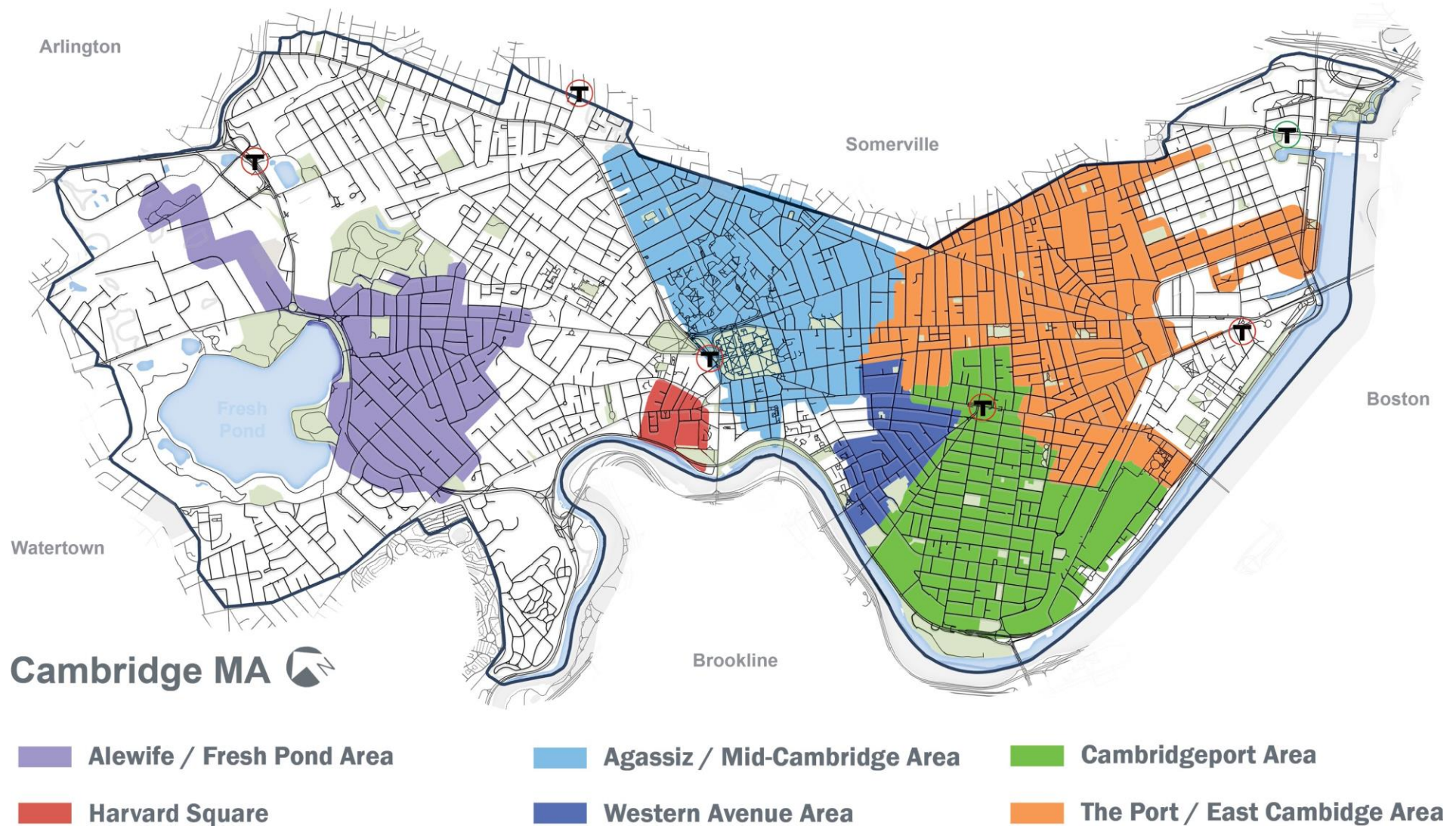
# PROGRAMS | SEWER SEPARATION & STORMWATER

The City has an ongoing 5 Year Capital Program for sewer separation, stormwater management and infrastructure renewal throughout the City. The City is committed to **restoring and enhancing streets, sidewalks, and bicycle facilities** as an integral part of these projects. These projects are subject to change in schedule due to financial, legal, environmental, and level of service considerations.





# PROGRAMS | SEWER SEPARATION & STORMWATER





# PROGRAMS | SEWER SEPARATION & STORMWATER

Since the 1800's, thousands of hours of engineering and millions of dollars of construction have been allocated to realize a more efficient and environmentally-friendly system.



- Sewer separation continues today and the city's collection system currently includes approximately 111 miles of sanitary sewer, 97 miles of stormwater drains, and 37 miles of combined sewer.
- Approximately 40% of the collection system owned and maintained by Cambridge has been separated—much work remains.
- Projects involve intense construction and typically include rebuilding roadways and sidewalks.



# PROGRAMS | STREET & SIDEWALK

Street and sidewalk contracts are funded locally and by the state. These contracts are managed by the Department of Public Works. Construction generally includes surface enhancements such as:

- Paving
- Sidewalk and pedestrian ramps
- Traffic calming
- Street trees
- Stormwater management and green infrastructure
- Bike and transit improvements

## Toolbox Design Elements





# PROGRAMS | MISCELLANEOUS SIDEWALK

## Program Highlights

- Budget: \$800,000 per year.
- This program is used to address discrete sections of sidewalk throughout the City.
- Repairs are typically a block in length, but can be as small as one panel.
- Priority is given to sidewalks and curb cuts in High Priority Areas.



Photo Credit:  
Christian Phillips Photography and Klopfer Martin Design Group



# PROGRAMS | MISCELLANEOUS SIDEWALK

## Accessibility

DPW makes smaller repairs throughout the year to maintain accessibility across the City.

A portion of the Miscellaneous Sidewalk Program funding will be reserved for **sidewalks and curb cuts** where access is of acute importance, as identified by the **Commission for Persons with Disabilities and the DPW**.

If you know of a location that is a critical access issue and is not addressed in the 5 Year Plan, please contact the Commission.

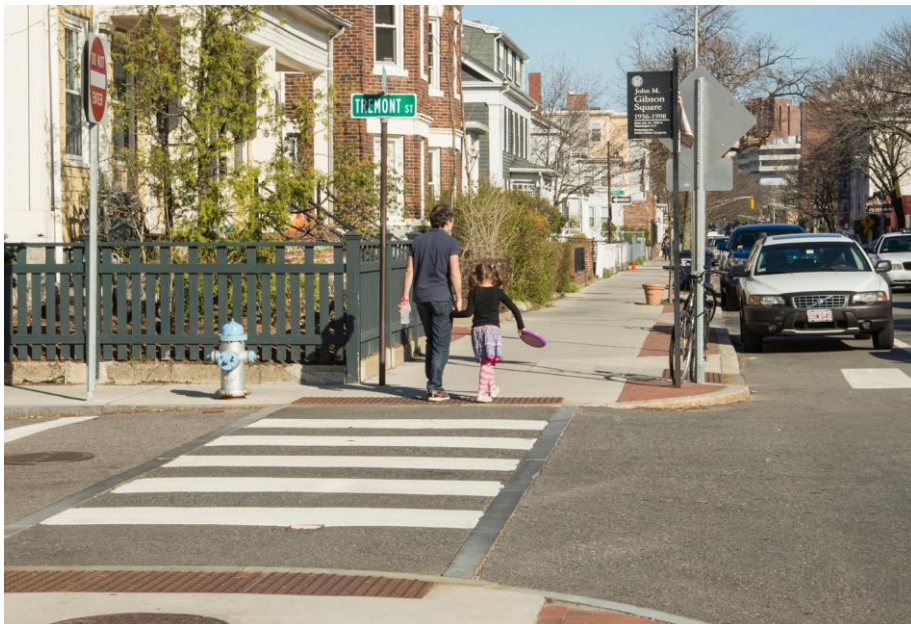


## **Cambridge Commission for Persons with Disabilities**

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**Kate Thurman**, Disability Project Coordinator  
51 Inman Street, Second Floor  
Cambridge, MA 02139  
[ccpd@cambridgema.gov](mailto:ccpd@cambridgema.gov)  
Voice: 617-349-4692 / TTY: 617-492-0235  
Fax: 617-349-4766  
[www.cambridgema.gov/disabilities](http://www.cambridgema.gov/disabilities)



# DESIGN | PEDESTRIAN RAMPS



Pedestrian ramps are a critical element of the accessible sidewalk. The details of the design and construction have a significant impact on their usability.

- All new pedestrian ramps, including landing areas, will be concrete and include tactile warning strips.
- All slopes will meet ADA /AAB requirements.
- All new pedestrian ramps will be designed to:
  - Minimize ponding.
  - Locate ramps as close to the intersection as possible.

The best design for pedestrian crossings, particularly on narrow side streets, may be a modified raised crosswalk that:

- Allows pedestrians to cross the street without having to ramp down.
- Reduces the risk of ponding.
- Keeps the crossing more in line with the sidewalk.



# DESIGN | PEDESTRIAN ACCESS



## MID-BLOCK CROSSINGS

Are generally not used, unless the blocks are especially long or there is an especially large pedestrian flow.



## 4-WAY INTERSECTIONS

Unless site conditions warrant a different treatment, 4 crosswalks and 8 pedestrian ramps should be provided.

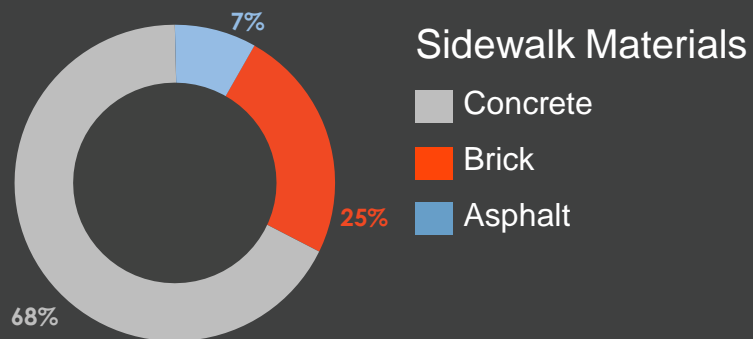


## “T” INTERSECTIONS

At least 1 crosswalk and 2 pedestrian ramps are required for accessible path of travel along the main corridor. Site conditions are considered to determine if crosswalks should be provided.



# DESIGN | SIDEWALK MATERIALS



Concrete and wire cut brick without beveled edges, placed on a smooth asphalt base, will be utilized as the sidewalk materials of choice throughout the City. Concrete is the material most frequently used in the city (~70%) and provides a relatively inexpensive, durable, and easy to maintain accessible sidewalk.

The City policy is to replace existing sidewalks with the same material at no cost to the property owner. However, during construction, property owners are contacted and may choose to change the sidewalk material. On larger projects, a more unified approach to sidewalk materials has been implemented as part of a community process.

## Historic Districts

DPW works collaboratively with the Historic Commission to ensure that sidewalk reconstruction work is appropriate and not incongruous to the district.

## Standard Details

[www.cambridgema.gov/theworks/ourservices/engineering/Resources/standarddetails](http://www.cambridgema.gov/theworks/ourservices/engineering/Resources/standarddetails)



# DESIGN | BICYCLE FACILITIES

## Bicycle Facilities

- Improvements for bicycling will be considered in all projects undertaken in the City and will be guided by the Bicycle Plan.
- The Bicycle Plan lays out a vision for where we as a City want to be. The fundamental guiding principle for this plan is to enable people of all ages and abilities to bicycle safely and comfortably throughout the City. The Bicycle Plan provides the framework for developing a network of Complete Streets and supporting programs and policies that will help meet this goal.



Photo Credit:  
Toole Design Group



# DESIGN | TRANSIT

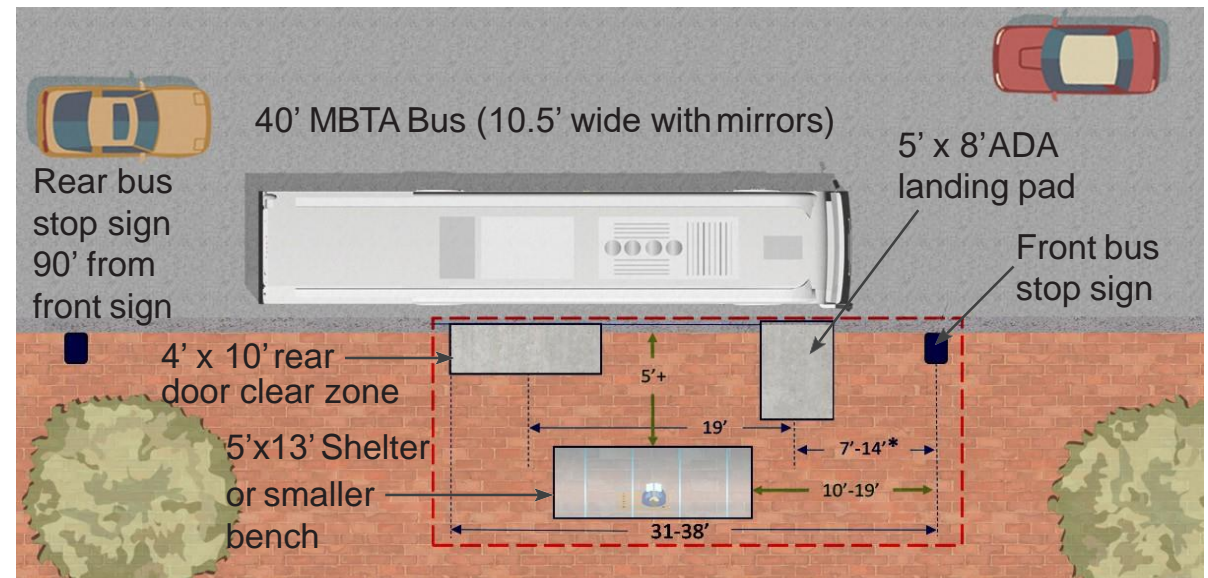
Transit considerations include:

## Accessibility

Ensure that bus stops are accessible and provide amenities when appropriate.

## Priority

City performed a bus delay and reliability assessment so that we can explore options for transit priority (e.g. dedicated lanes) in roadway projects where there are expected benefits.



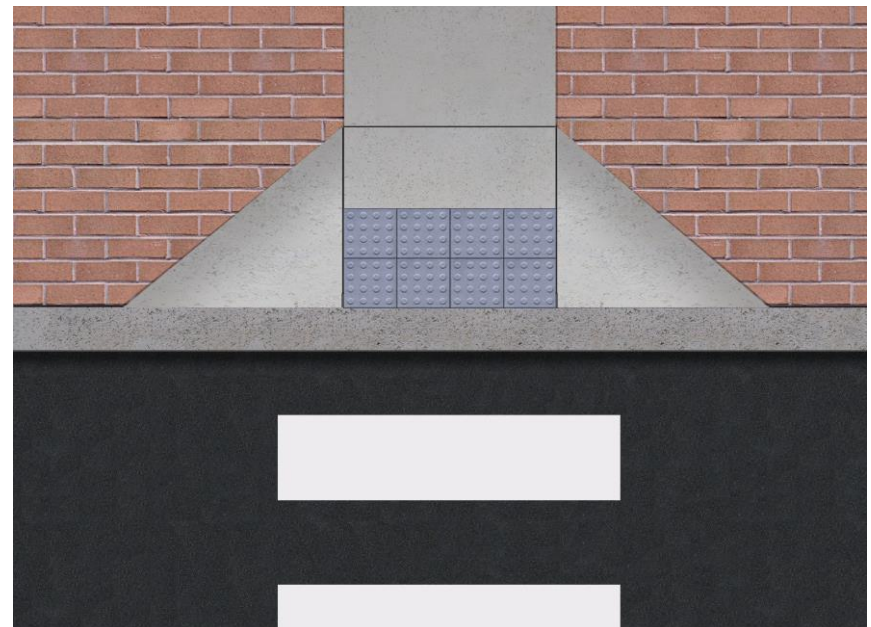


# SCOPE | NEW CONSTRUCTION

## City Projects

Below are the requirements specific to all City of Cambridge construction projects in the Public Right of Way. The goals of these requirements are to meet state and federal regulations, maximize **accessibility improvements**, and minimize the extent to which work has to be reconstructed in the future.

- New sidewalks (concrete or brick) will **meet ADA/AAB requirements**.
- Roadway paving that abuts pedestrian ramps will include the **reconstruction of abutting non-compliant pedestrian ramps**.
- **15' Rule:** To minimize the need for non-compliant transition segments between old and new sidewalks, if a compliant segment within 15 ft. of the end of proposed new work is identified, work will be extended to the compliant segment.
- If a significant portion of sidewalk on a given side of a block is reconstructed, the **entire sidewalk on that side should be compliant**.





# SCOPE | NEW CONSTRUCTION

## Private Entities

Requirements specific to street and sidewalk reconstruction projects constructed by private entities within the City of Cambridge Public Right of Way will adhere to the same requirements as City projects in addition to the below requirements:

- If a full block of sidewalk is being reconstructed, a PE stamped design will be required and a PE certification of compliance will be required after construction.
- If more than 30 ft. of sidewalk, a curb cut, or a driveway is being constructed, a survey and design will generally be required. Survey and design requirements will be determined by DPW based on the specific location.



# SCOPE | NEW CONSTRUCTION

## Private Utilities

Below are the requirements specific to all street and sidewalk reconstruction projects constructed by private utilities within the City of Cambridge Public Right of Way.



- Sidewalk construction subsequent to utility work will meet ADA / AAB requirements.
- Roadway paving (subsequent to utility work) that abuts pedestrian ramps, will include the reconstruction of abutting non-compliant pedestrian ramps.
- If a full block of sidewalk is being reconstructed, due to utility work, a PE stamped design will be required and a PE certification of compliance will be required after construction.
- If more than 30 ft. of contiguous sidewalk, a curb cut, or a driveway is being constructed, due to utility work, a survey and design will generally be required. Survey and design requirements will be determined by DPW based on the specific location.
- In lieu of final restoration, payments made by utility companies (Street Preservation Offset Fees) will include the complete cost of necessary sidewalk restoration.



# SCOPE | STREET TREES

## Existing Street Trees

Existing street trees will be protected during construction and the sidewalks will be carefully evaluated to ensure adequate accessible routes through the neighborhood.

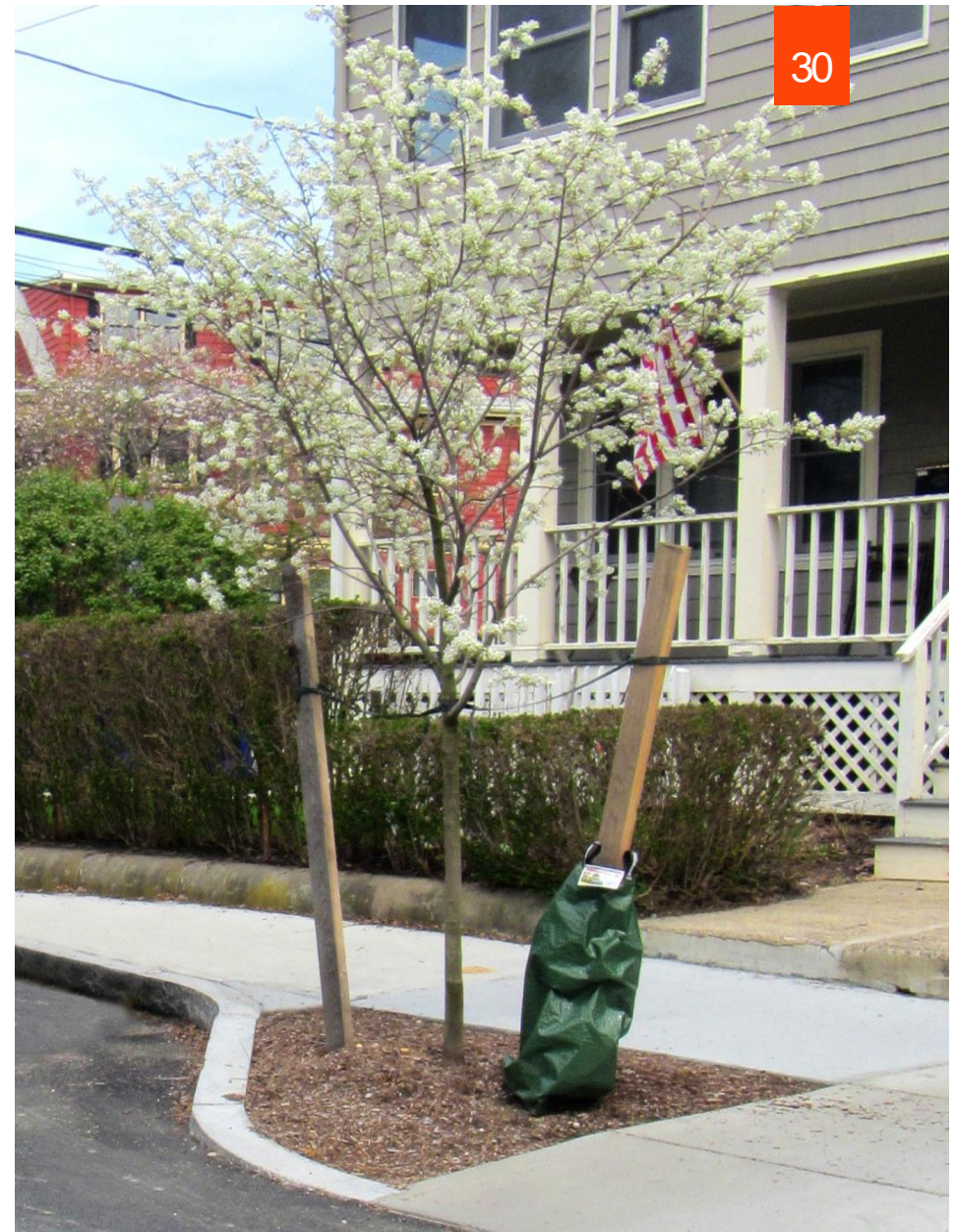
## New Tree Plantings

The City Arborist will review each street and sidewalk project to determine tree planting opportunities; evaluating the location of overhead and underground utilities, proximity to intersections, site lines, building setbacks, locations of entrances, etc.

- On **narrow sidewalks** (less than 8' wide), a minimum of 4' of sidewalk width will be retained adjacent to new trees.
- On **wider sidewalks** (8' wide or greater), a minimum of ½ of the overall sidewalk width will be retained for pedestrians.

## Back of Sidewalk Trees

The Arborist will work with residents interested in back of sidewalk tree plantings.



## GOALS

- **Protect existing** street trees during construction.
- Increase the number of street trees and maintain **accessible sidewalks**.



# SCOPE | GREEN INFRASTRUCTURE

The City is incorporating green infrastructure on smaller projects, as conditions and space allow.

## Types of Improvements

- Porous asphalt
- Infiltrating catch basins
- Rain gardens/bio basins

## Siting Evaluation

- Soil conditions
- Groundwater
- Space constraints
- Maintenance

## Goals

- Stormwater discharges are contributing to at least 55% of impairments to Massachusetts' assessed waters.
- Goal: **improve the water quality** of stormwater before discharging to outfalls at the Alewife Brook and Charles River.





# SCOPE | TRAFFIC SIGNALS

## Accessible Pedestrian Signals (APS)

APS work in conjunction with visual pedestrian signals to provide additional information to pedestrians, including pedestrians who are blind or visually impaired. APS typically use a combination of auditory and vibrotactile information to alert pedestrians as to when they should cross the street.

The City is implementing APS at new and existing signalized intersections. The Traffic Department consults with the Disabilities Commission to prioritize location.

## Signal Control Cabinets

Traffic signal control cabinets mounted on poles are under consideration for relocation by the Traffic Department. In coordination with adjacent construction projects, and at high priority locations, control cabinets will be moved to ground mounted locations.





# CONSTRUCTION | PEDESTRIAN ACCESS



Where pedestrian routes are closed, alternate pedestrian routes shall be provided.



The Manual on Uniform Traffic Control Devices, (MUTCD), published by the US DOT / Federal Highway Administration, includes specific requirements for pedestrian access in work zones.



Whenever possible, work should be done in a manner that does not create a need to detour pedestrians from existing routes or crossings.



# CONSTRUCTION | BICYCLE ACCESS



- Maintain bicycle access through construction sites. Where maintaining bike lanes is not possible:
  - Ensure adequate space for bicycles in travel lane.
  - Post “*Bicycles May Use Full Lane*” signs.
- Road signs of any type should not be placed in bicycle lanes.
- Asphalt is the preferred temporary surface option.
- Surfaces should be smooth, and edges should be uniform.
- When steel plates are required, provide advance notice and a smooth transition.
- Where raised castings are exposed, spray paint them pink and post caution signs.

Follow City of Cambridge Bicycle Accommodation During Construction Guidelines at:  
[www.cambridgema.gov/theworks/ourservices/engineering/Resources/contractorresources](http://www.cambridgema.gov/theworks/ourservices/engineering/Resources/contractorresources)



# CONSTRUCTION | TRANSIT

Coordinate closely with MBTA on any impact (diversions) to transit routes

- Monthly interdepartmental coordination meetings with the MBTA.
- Targeted coordination with DPW and MBTA service planning staff as needed.

During construction routes and stops may be moved.

- Communicate relocated bus stops to the public via notices and signage.
- Ensure accessibility at temporary stops.





# NEXT STEPS | CONCLUSION

The 5 Year Plan is a living document that will be updated regularly. As part of that process, the DPW will:

- Review plan annually with the Commission for Persons with Disabilities and Pedestrian, Bicycle, and Transit Committees.
- Update the pavement condition and sidewalk condition data and corresponding maps.
- Annually update the 5 Year Plan to account for the changing conditions of our streets and sidewalks.

**Send questions or comments to:**

Katherine Watkins, PE  
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*Photos & Graphics by Kleinfelder*